

CLAIMS

1. Apparatus for treatment of a patient condition, comprising:
an applicator having a skin-contacting surface comprising at least one protuberance, and
at least one optical radiation source coupled to said applicator in a manner so as to, when activated, deliver optical radiation through said skin-contacting surface to a patient's skin in contact with said surface.
2. Apparatus as claimed in claim 1 wherein said applicator is in the form of a brush adapted to be moved over the patient's skin surface as radiation is applied thereto.
3. Apparatus as claimed in claim 1 wherein said applicator is in the form of a roller adapted to be moved over the patient's skin surface as radiation is applied thereto.
4. Apparatus as claimed in claim 1 wherein said skin-contacting surface has at least one protuberance selected from the group of projections and bristles extending therefrom.
5. Apparatus as claimed in claim 1 wherein said protuberance is adapted to apply a compressive force to the skin during use.
6. Apparatus as claimed in claim 1 wherein said radiation at the patient's skin surface is between approximately 1 mW/cm^2 and approximately 100 W/cm^2 , the radiation depending at least on the condition being treated and the wavelength of the radiation.
7. Apparatus as claimed in claim 6 wherein said radiation at the patient's skin surface is between 10 mW/cm^2 and 10 W/cm^2 .

8. Apparatus as claimed in claim 1 wherein said at least one optical radiation source is an array of optical radiation sources, each said source being mounted to deliver optical radiation through at least one corresponding protuberance.

9. Apparatus as claimed in claim 8 wherein each of the plurality of sources is mounted to deliver radiation through a corresponding protuberance.

10. Apparatus as claimed in claim 8 wherein a skin contacting end of each protuberance has total internal reflection for the radiation when not in contact with the patient's skin, but passes radiation to the patient's skin when in contact therewith.

11. Apparatus as claimed in claim 1 wherein said at least one optical radiation source is an array of semiconductor radiation-emitting elements.

12. Apparatus as claimed in claim 1 wherein the at least one optical radiation source is operable at different wavelengths to effect a desired treatment protocol.

13. Apparatus as claimed in claim 1 wherein the at least one optical radiation source is a continuous wave radiation source.

14. Apparatus as claimed in claim 1 further comprising a heat sink.

15. Apparatus as claimed in claim 14 including a handle for said apparatus which is adapted to be held by the operator when the apparatus is in use, said heat sink sinking heat from said at least one radiation source to said handle, heat from said handle being sunk to said operator's hand.

16. Apparatus as claimed in claim 1 including a detector of contact between said applicator and the patient's skin, and controls operative in response to said detector for permitting radiation to be applied from said at least one source to the patient's skin.

17. Apparatus as claimed in claim 1 wherein said apparatus includes a mechanism for applying a substance to the patient's skin as the skin is being irradiated.
18. Apparatus as claimed in claim 1 wherein said radiation sources are retrofitted to said applicator, and including a mechanism for attaching the sources to the applicator.
19. Apparatus as claimed in claim 1 wherein said at least one radiation source is part of said applicator.
20. Apparatus as claimed in claim 1 wherein said applicator is a hand-held unit.
21. Apparatus as claimed in claim 1 wherein said skin-contacting surface is formed of a plate having good thermal conducting properties, said at least one optical radiation source being mounted to said plate so that heat from said at least one source heats said plate, said heated plate thereby being adapted to heat a skin region during use.
22. Apparatus as claimed in claim 1 including a heat sink component in thermal contact with said at least one source, said component being adapted to be cooled prior to use of the apparatus.
23. Apparatus as claimed in claim 22 wherein said component undergoes a phase change when cooled, and returns to its initial phase when extracting heat from said at least one source.
24. Apparatus for treatment of a patient condition, comprising:
- an applicator including at least one liquid delivery conduit for directing liquid onto a skin surface, and
 - at least one optical radiation source coupled to said applicator in a manner so as to, when activated, deliver optical radiation together with the liquid to the skin surface.

25. Apparatus as claimed in claim 24 wherein said applicator is a bath brush, water being applied through said applicator both for bathing or showering.

26. Apparatus as claimed in claim 25 wherein water is applied to also cool at least one radiation source.

27. Apparatus as claimed in claim 24 wherein said water is applied through openings in said surface to form water streams, and wherein radiation from said at least one source is also applied through said openings, said streams acting as wave guides for delivery of said radiation to the patient.

28. Apparatus as claimed in claim 24 wherein said applicator is shaped to fit a portion of the patient's body to be treated.

29. Apparatus as claimed in claim 24 including a mechanism for at least one of vibrating and otherwise stimulating the skin.

30. Apparatus as claimed in claim 24 wherein said radiation sources are retrofitted to said applicator, and including a mechanism for attaching the sources to the applicator.

31. Apparatus as claimed in claim 24 wherein said at least one radiation source is part of said applicator.

32. Apparatus as claimed in claim 24 wherein said applicator is a hand-held unit.

33. Apparatus as claimed in claim 24 wherein said skin-contacting surface is formed of a plate having good thermal conducting properties, said at least one optical radiation source being mounted to said plate so that heat extracted from said at least one source heats said plate, said heated plate thereby being adapted to heat a skin region during use.

34. Apparatus as claimed in claim 24 including a heat sink component in thermal contact with said at least one source, said component being adapted to be cooled prior to use of the apparatus.

35. Apparatus as claimed in claim 34 wherein said component undergoes a phase change when cooled, and returns to its initial phase when sinking heat from said at least one source.

36. Apparatus for treatment of a patient condition, comprising:

an applicator having a skin-contacting surface, and

at least one optical radiation source coupled to said applicator in a manner so as to, when activated, deliver optical radiation through said skin-contacting surface to a patient's skin in contact with said surface,

wherein the apparatus further comprises a mechanism for applying at least one of a magnetic field, an electric field and an acoustic field to the patient's skin.

37. Apparatus as claimed in claim 36 wherein said skin contacting surface is created such that it retro-reflects radiation reflected from the patient's skin back into the skin.

38. Apparatus as claimed in claim 36 including a generator activated by movement of the applicator over the patient's skin to generate electrical energy for the radiation sources.

39. Apparatus as claimed in claim 36 wherein said radiation sources are retrofitted to said applicator, and including a mechanism for attaching the sources to the applicator.

40. Apparatus as claimed in claim 36 wherein said at least one radiation source is part of said applicator.

41. Apparatus as claimed in claim 36 wherein said applicator is a hand-held unit.

42. Apparatus as claimed in claim 36 wherein said skin-contacting surface is formed of a plate having good thermal conducting properties, said at least one optical radiation source being mounted to said plate so that heat extracted from said at least one source heats said plate, said heated plate thereby being adapted to heat a skin region during use.

43. Apparatus as claimed in claim 36 including a heat sink component in thermal contact with said at least one source, said component being adapted to be cooled prior to use of the apparatus.

44. Apparatus as claimed in claim 43 wherein said component undergoes a phase change when cooled, and returns to its initial phase when sinking heat from said at least one source.

45. Apparatus for treatment of a patient condition, comprising:

a retrofit housing adapted to be joined to a skin-contacting device, and
at least one optical radiation source coupled to the retrofit housing in a manner so as to, when activated, deliver optical radiation to a skin surface concurrently with use of the skin-contacting device.

46. Apparatus as claimed in claim 45 wherein the skin-contacting device is in the form of a brush adapted to be moved over the patient's skin surface as radiation is applied thereto.

47. Apparatus as claimed in claim 45 wherein the skin-contacting device is in the form of a roller adapted to be moved over the patient's skin surface as radiation is applied thereto.

48. Apparatus as claimed in claim 45 wherein said skin-contacting surface has at least one protuberance selected from the group of projections and bristles extending therefrom.

49. Apparatus as claimed in claim 45 wherein said protuberance is adapted to apply a compressive force to the skin during use.
50. Apparatus as claimed in claim 45 wherein the skin-contacting device is in the form of a bath brush adapted to deliver water to a skin surface as radiation is applied thereto.
51. Apparatus as claimed in claim 45 wherein said radiation at the patient's skin surface is between approximately 1 mW/cm^2 and approximately 100 W/cm^2 , the radiation depending at least on the condition being treated and the wavelength of the radiation.
52. Apparatus as claimed in claim 51 wherein said energy at the patient's skin surface is between 10 mW/cm^2 and 10 W/cm^2 .
53. Apparatus as claimed in claim 45 wherein said at least one optical radiation source is an array of semiconductor radiation-emitting elements.
54. Apparatus as claimed in claim 45 wherein the at least one optical radiation source is operable at different wavelengths to effect a desired treatment protocol.
55. Apparatus for phototreatment substantially as shown and described.